SON-2897 PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re the Patent Application of	
YASUTOSHI INOUE ET AL.	Group Art Unit: 2627
Application Serial No. 10/750,820	Examiner: DISMERY MERCEDES
Filed: January 5, 2004	***Confirmation No: 1638***
For: HEAD SYSTEM, RECORDING AND REPRODUCTIONI SYSTEM, AND MAGNETIC RECORDING METHOD	

APPEAL BRIEF

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Sir:

This Appellant's Brief on Appeal is timely filed under the provisions of 37 CFR § 41.37, following a Notice of Appeal filed on August 14, 2006, and Petition for Two Month Extension of Time filed herewith. By this brief, the authorities and arguments on which the Appellant will rely to maintain this appeal are set forth. The brief contains the items specified by Rule 41.37(c), under appropriate headings and in the requisite order.

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I. REAL PARTY IN INTEREST

The real party of interest in this appeal is Sony Corporation of Tokyo, Japan, which is, by assignment of the inventors, the current owner of this patent application. The assignment was recorded on June 18, 2004, at Reel 015493, Frame 0048.

II. RELATED APPEALS AND INTERFERENCES

There are no other appeals or interferences related to this application at this time.

III. STATUS OF THE CLAIMS

Claims 1, 2, 5, 6, 9 and 10 remain pending in this application.

Claims 3, 4, 7, 8 and 11 have been previously cancelled.

Claims 1, 2, 5, 6, 9 and 10 stand finally rejected and are the subject of this appeal. A copy of the finally rejected claims is provided in the attached Appendix of Claims Involved in the Appeal.

IV. STATUS OF THE AMENDMENTS

An Amendment After Final has been filed in this application, but has not yet been entered by the Examiner and is therefore not reflected in the Appendix of Claims. The Amendment After Final proposes minor corrections to claims 2 and 5 to present the claims in better form for consideration on appeal. The proposed amendments to claims 2 and 5, if entered, will not change the scope of the claims or otherwise affect the issues on appeal.

A Preliminary Amendment filed on October 26, 2004, and an Amendment in Response to Non-Final Office Action filed on February 3, 2006, have been entered previously.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The Appellants' claimed invention is summarized below with reference to the corresponding parts of the Appellants' specification and drawings.

The present invention provides a head system (claims 1 and 2), a recording and reproduction system (claims 5 and 6), and a magnetic recording method (claims 9 and 10), all of which are used for performing azimuth recording on a recording medium 2 by use of a plurality of recording heads 11A, 11B (see Appellants' original specification, page 12, lines 3 to 9). To fully understand the issues presented on appeal, it is important to understand the basic difference between a fixed head system (as described below in connection with the prior art applied by the Examiner) and a helical scan system (as used in the Appellants' invention).

A helical scan recording system as used by the Appellants' invention involves using a tape feeding means 5 (page 13, lines 17 to 22) to move the tape form recording medium 2 past a rotary drum 12 on which recording heads 11A, 11B are mounted (see, e.g., Figs. 1 and 2; page 14, lines 10 to 19). The recording media 2 passes around the rotary drum 12 in a helical path while the rotary drum 12 rotates at a high speed (this is conventional in helical scan systems). As a result, signals are recorded as inclined tracks MP(A1, B1, A2, B2) (see Fig. 4) across the recording media 2 (not tracks that extend in the longitudinal direction of the media as in a fixed head system) (see, e.g., page 18, lines 12 to 22). While the recording media 2 moves through the

system at a relatively slow speed, the rotary drum 12 moves at a high speed so that the relative velocity between the recording heads 11A, 11B and the recording media 2 is high (again, this is conventional in helical scan systems). The helical scan recording technology allows higher bandwidth signals to be recorded onto magnetic tape than would otherwise be possible at the same tape speed with fixed head systems. Examples of known helical scan recording systems having the above-described features are disclosed, for example, on pages 1 to 6 of the Appellants' specification, and in U.S. Patent No. 5,745,318 issued to Kubota et al.

The Appellants' invention provides an improvement over existing helical scan recording systems by improving the accuracy of the width Tp of the magnetization patterns MP(A1, B1, A2, B2) (i.e., the inclined tracks) formed on the recording medium 2 (page 6, line 19, to page 7, line 1). The invention includes first and second recording heads 11A, 11B that are mounted on a rotary drum 12 (page 14, lines 10 to 15). The recording heads 11A, 11B are thin-film heads constituted by a single head chip (page 16, lines 16 to 21). The first recording head 11A (Fig. 3, Head A) includes a plurality of first magnetic gaps A1, A2 having a first azimuth angle (page 15, line 19, to page 16, line 4). The second recording head 11B (Fig. 3, Head B) includes a plurality of second magnetic gaps B1, B2 having a second azimuth angle (page 16, lines 5 to 8). The first azimuth angle of the first magnetic gaps A1, A2 is different from the second azimuth angle of the second magnetic gaps B1, B2 (Fig. 3; page 16, lines 5 to 8).

The positional relationship between the first magnetic gaps A1, A2 and the second magnetic gaps B1, B2, as shown in Fig. 3, provides a system that forms the magnetization patterns MP(A1, B1, A2, B2) shown in Figs. 5 to 7 during use (page 18, line 23, through page

23, line 2). Specifically, as recited in Appellants' independent claims 1, 5 and 9, the side edge portions of the magnetization patterns MP(A1, A2) formed on the recording medium 2 by the first magnetic gaps A1, A2 of the first recording head 11A in the formation direction are overwritten by the second magnetic gaps B1, B2 of the second recording head 11B (page 22, line 20, through page 23, line 2).

That is, as the rotary drum 12 on which the magnetic heads 11A, 11B are mounted is rotated, the first magnetic gaps A1, A2 of the first recording head 11A form a first set of magnetization patterns MP(A1, A2) on the recording medium 2 as the first recording head 11A passes by the recording medium 2, and the second magnetic gaps B1, B2 of the second recording head 11B then form a second set of magnetization patterns MP(B1, B2) on the recording medium 2 as the second recording head 11B passes by the recording medium 2 following the first recording head 11A. The side edges of the first magnetization patterns MP(A1, A2) are overwritten by the second magnetization patterns MP(B1, B2) in the manner shown in Figs. 5 to 7 (see, e.g., page 20, line 7, through page 21, line 4; and page 22, line 20, through page 23, line 2). This feature of the Appellants' invention allows recorded signal patterns to be formed with stable and high accuracy, even where slight variations occur in the relative heights of the heads 11A, 11B during manufacturing, and under conditions where the rotating drum 12 undergoes oscillation or rotational jitter (see, e.g., page 26, lines 2 to 14; and page 27, lines 10 to 21).

As recited in Appellants' claims 2, 6 and 10, the overwriting of the side edges of the first magnetization patterns MP(A1, A2) formed by the first recording head 11A coincides substantially with the center of each magnetization pattern MP(B1, B2) formed by the second

recording head 11B (page 20, lines 13 to 17; and page 20, line 22, through page 21, line 4). This feature is shown, for example, in Figs. 5 and 6 where the lower side edges of each of the first magnetization patterns MP(A1, A2) coincides with an approximate center of the second magnetization patterns MP(B1, B2).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The only ground of rejection presented for review in this appeal is the Examiner's rejection of claims 1, 2, 5, 6, 9 and 10 under 35 U.S.C. § 102(b) as being anticipated by Arai et al. (U.S. Patent No. 4,539,615; hereafter referred to as "Arai et al.").

VII. ARGUMENT

A. Grouping of the Claims

It is respectfully submitted that the claims do not stand or fall together as a single group for purposes of this appeal. More specifically, it is submitted that the claims on appeal can be grouped into the following groups for purposes of this appeal:

1. Claims 1, 5 and 9.

2. Claims 2, 6 and 10.

The arguments set forth in the following section provide reasons why each of these groups should be considered separately.

B. The Examiner Erred in Rejecting Claims 1, 2, 5, 6, 9 and 10 under 35 U.S.C. § 102(b) As Being Anticipated By Arai et al.

1. Introduction

Claims 1, 2, 5, 6, 9 and 10 stand finally rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Arai et al. (U.S. Patent No. 4,359,615). The Examiner contends that Arai et al. discloses each and every feature of the Appellants' claimed invention recited in these rejected claims. The Appellant respectfully disagrees and submits that this rejection is improper and should be reversed for the following reasons.

The final rejections are all based on the Examiner's position that the claims are "anticipated" by the prior art reference of Arai et al. "A claim is anticipated [under 35 U.S.C. § 102(b)] only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." Verdegaal Bros. v. Union Oil Co. of California, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987) (emphasis added). See M.P.E.P. § 2131. Moreover, the initial burden is on the Examiner to identify where in the reference each element of the claimed invention may be found. Ex parte Levy, 17 U.S.P.Q.2d 1461 (BPAI 1990). The Examiner has failed to meet this burden in the present case.

The following sections will discuss the Arai et al. reference, specify the errors in each rejection under 35 U.S.C. § 102(b) based on Arai et al., and explain why the rejected claims are patentable over the Arai et al. reference. The specific limitations in the rejected claims not described in the Arai et al. reference will also be identified.

2. Disclosure of Arai et al.

Arai et al. discloses a fixed head recording system, which is used to record and reproduce information on and from recording tracks 5_{1-3}, 6_{1-3} that extend in the longitudinal direction of a magnetic tape T (see Abstract, lines 1 to 5). The tape T is drawn past a fixed head MH at a linear speed, and the fixed head MH creates a fluctuating magnetic field that forces particles on the tape T to line up with the field in response to the signal to be recorded. The magnetic orientation of the magnetic particles on the tape T after passing the fixed head MH carries an imprint of the signal in the longitudinally extending recording tracks 5_{1-3}, 6_{1-3}.

In one embodiment shown in Fig. 14A of Arai et al., two magnetic heads MH1 and MH2 are used to accomplish two-way recording (i.e., recording in both the forward and backward directions of the tape) (see column 10, lines 39 to 50). The first magnetic head MH1 is a stationary head used for forward recording and includes head gaps g_1, g_2 and g_3 (column 10, lines 43 to 44). The second magnetic head MH2 is a stationary head used for backward recording and includes head gaps $g_{1'}$, $g_{2'}$ and $g_{3'}$ (column 10, lines 45 to 46). The stationary magnetic heads MH1 and MH2 are electrically switched by a change-over means (not shown) so that the first head MH1 is placed in service for forward recording, and the second head MH2 is placed in service for backward recording (column 10, lines 47 to 50).

As illustrated in Fig. 15 of Arai et al., the stationary magnetic head MH1 provides magnetization patterns on forward recording tracks 5_1, 5_2 and 5_3, and the stationary magnetic head MH2 provides magnetization patterns on backward recording tracks 6_1, 6_2 and 6_3 (column 10, lines 51 to 58). All of the forward and backward recording tracks 5_1, 5_2, 5_3, 6_1, 6_2, 6_3 extend

in the longitudinal direction. The magnetization patterns formed in the longitudinal recording tracks 5_1, 5_2, 5_3, 6_1, 6_2, 6_3 are made such that the magnetization patterns formed on two adjoining recording tracks 5_1, $6_1$are different from each other. This is accomplished using an azimuth recording technique in which the head gaps $g_{1\text{-}3}$, $g_{1\text{-}3'}$ of the stationary heads MH1, MH2 are positioned at a different angle relative to the tape T (column 11, lines 41 to 48). As a result the cross-talk of information from one recording track to another is reduced.

Arai et al. also disclose an embodiment in Fig. 16A in which a single magnetic head MH1 is mounted on a stepping motor 47 (column 12, lines 7 to 21). The single magnetic head MH1 is used for both forward and backward recording using the same head gaps g_1, g_2 and g_3 (column 12, line 28, through column 13, line 40). The stepping motor 47 is activated to invert the attitude of the magnetic head MH1 from a direction X_1 for forward travel of the magnetic tape T past the magnetic head MH1 (column 12, lines 64 to 68) to a direction X_2 for backward travel of the magnetic tape (column 13, lines 29 to 46). During the recording and reproduction, the magnetic tape T is driven past the magnetic head MH1 while the head remains stationary. The stepping motor 47 is only activated to invert the orientation of the head gaps g_1, g_2 and g_3 when switching between forward and backward directions for the tape travel (column 12, line 64, to column 13, line 2; and column 12, lines 29 to 34).

The Appellants' invention, by contrast, uses a helical scan recording system in which the recording media is moved past a rotary drum on which the recording heads are mounted. Signals are recorded in inclined tracks across the recording media (not tracks that extend in the longitudinal direction of the media as in Arai et al.). While the recording media moves through a

helical scan recording system as in the Appellants' invention, the rotary drum rotates and causes the recording heads to create the inclined tracks across the recording media.

These basic differences between Arai et al. and the Appellants' claimed invention clearly distinguish the Appellants' invention over Arai et al. as further explained below.

3. Rejection of Claims 1, 5 and 9

Arai et al. fails to disclose certain basic features of the Appellants' claimed invention recited in each of independent claims 1, 5 and 9. Specifically, each of the claims recites that the "first and second recording heads are mounted on a rotary drum." As explained above, the recording heads MH1 and MH2 in the embodiment of Fig. 14A of Arai et al. are stationary heads that are not mounted on a rotary drum. There is no structure in the Fig. 14A embodiment of Arai et al. that can be construed as the claimed rotary drum recited in the Appellants' claims 1, 5 and 9.

Further, the recording head MH1 in the embodiment of Fig. 16A of Arai et al. does not anticipate the Appellants' invention because: (1) the stepping motor 47 cannot be construed as a rotary drum, and (2) only one magnetic head MH1 is used in this embodiment of Arai et al. (the stepping motor 47 eliminates the need for a second magnetic head MH2).

Further, neither of the Fig. 14A or Fig. 16A embodiments of Arai et al. disclose the Appellants' claimed feature of the magnetization patterns being formed on the recording medium as an inclined track. This feature of the Appellants' claimed invention is characteristic of helical scan recording systems, but not fixed head recording systems. As explained above, Arai et al.

discloses a fixed head recording system that records information in tracks that extend in the longitudinal direction of a magnetic tape.

Independent claims 1, 5 and 9 also have other features to distinguish the Appellants' invention from other helical scan recording systems known in the prior art (i.e., recording systems that use a rotary drum to record magnetization patterns in inclined tracks). Specifically, claim 1 recites that:

> *a positional relationship between said first and second magnetic gaps is so determined that in relation to each magnetization pattern formed on said recording medium by said first magnetic gaps of said first recording head, side edge portions in the formation direction of said patterns are overwritten by said second magnetic gaps of said second recording head*

Similar claim language is recited in independent claim 5, as well as the method steps recited in independent claim 9.

The Examiner argues that this feature of the claimed invention is disclosed by Arai et al. However, since the magnetic heads in Arai et al. are not mounted on a rotary drum, the positional relationship between the magnetic gaps on the magnetic heads MH1 and MH2 in Arai et al. has little relevance to the Appellants' claimed invention. Although the forward and backward longitudinal tracks in Arai et al. are disclosed as having magnetization patterns recorded by magnetic gaps having different azimuth angles, such patterns are not recorded as inclined tracks by magnetic heads mounted on a rotary drum, as in the Appellants' claimed invention. Without this basic feature of the Appellants' invention, Arai et al. do not anticipate any of the independent claims on appeal.

Accordingly, it is respectfully submitted that claims 1, 5 and 9 are not anticipated by Arai et al.

4. Rejection of Claims 2, 6 and 10

Claims 2, 6 and 10 depend upon independent claims 1, 5 and 9, respectively, and are believed to be allowable for all of the reasons explained above regarding such claims. In addition, these claims further distinguish over Arai et al. by reciting the feature of the side edges of the magnetization patterns formed by the first magnetic gaps of the first recording head coinciding substantially with the center of the magnetization patterns formed by the second recording head. Specifically, claim 2 recites:

> *wherein said overwriting is conducted with such a positional relationship that a side edge portion of said magnetization pattern in the formation direction of said magnetization pattern formed by each said first magnetic gap of said first recording head coincides substantially with the center of each magnetization pattern formed by said second recording head*

Claim 6 includes substantially the same language as claim 2, and the method claim limitations recited in claim 10 are also directed to this same feature.

The Examiner contends that Arai et al. disclose this feature of the Appellants' invention in Figs. 16 to 18, and in column 12, line 30, through column 13, line 53. However, these portions of Arai et al. do not disclose the claimed feature. For example, Arai et al. states in column 13, lines 41 to 45, that "backward recording tracks 61, 62 and 63 [are] disposed closely adjacent to the forward recording tracks 5_1, 5_2 and 5_3 respectively, as shown in Fig. 18." No mention of an overlapping of the recording tracks is mentioned in the text portion of Arai et al.

cited by the Examiner, and certainly not the extent of overlapping recited in the Appellants' claims 2, 6 and 10.

Arai et al. does mention that a slight overlap of the backward recording tracks and the forward recording tracks might occur (see column 14, lines 3 to 26). This overlap in Arai et al. is described as changing the width of records formed on the first (e.g., forward) recorded tracks. In the only specific example given, the width change "is only about 0.4%" when the azimuth angle is about five degrees.

In the Appellants' claimed invention, a much more substantial width change of the first recorded track occurs. Specifically, the Appellants' invention recites that the overwriting is conducted such that the side edge portion of the first magnetization patterns coincides substantially with a center of the second magnetization pattern. This degree of overwriting is clearly much more than the incidental overwriting resulting in a 0.4% width change disclosed by Arai et al.

Further, it is again emphasized that the overwriting performed by the Appellants' invention is performed with recording heads mounted on a rotary drum for creating inclined tracks on the recording medium. This is completely different from the incidental slight overlap that occurs in Arai et al. when the tape passes by the stationary recording head in a backward direction after having been recorded in a forward direction.

Accordingly, it is respectfully submitted that claims 2, 6 and 10 are not anticipated by Arai et al.

C. Conclusion

In view of the foregoing, it is respectfully submitted that the final rejections of claims 1, 2, 5, 6, 9 and 10 are improper and should not be sustained. Therefore, a reversal of the final rejections of the Examiner is respectfully requested.

Respectfully submitted by:

Dated: **December 11, 2006**

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VIII. CLAIMS APPENDIX

Claims 1, 2, 5, 6, 9 and 10, which are all of the claims involved in the appeal, are reproduced below:

1. A head system for performing azimuth recording on a recording medium by use of a plurality of recording heads, wherein:

said head system comprises a first recording head including a plurality of first magnetic gaps having a first azimuth angle, and a second recording head including a plurality of second magnetic gaps having a second azimuth angle different from said first azimuth angle; and

a positional relationship between said first and second magnetic gaps is so determined that in relation to each magnetization pattern formed on said recording medium by said first magnetic gaps of said first recording head, side edge portions in the formation direction of said patterns are overwritten by said second magnetic gaps of said second recording head, wherein

said first and second recording heads are thin-film heads, and a single head chip constituting each said recording head is provided with a plurality of magnetic gaps and wherein

said first and second recording heads are mounted on a rotary drum, and each of said magnetization patterns formed on said recording medium is an inclined track.

2. The head system as set forth in claim 1, wherein said overwriting is conducted with such a positional relationship that a side edge portion of said magnetization pattern in the formation direction of said magnetization pattern formed by each said first magnetic gap of said first recording head coincides substantially with the center of each magnetization pattern formed by said second recording head, wherein

said first and second recording heads are thin film heads, and a single head chip constituting each said recording head is provided with a plurality of magnetic gaps.

3. (Cancelled)

4. (Cancelled)

5. A recording and reproduction system for performing azimuth recording on a tape form recording medium by a plurality of recording heads, said system comprising a head system having a plurality of said recording heads, and a tape feeding means for feeding said tape form recording medium, wherein

said head system comprises a first recording head including a plurality of magnetic gaps having a first azimuth angle, and a second recording head including a plurality of magnetic gaps having a second azimuth angle different from said first azimuth angle, and

a positional relationship between said magnetic gaps is so determined that in relation to each magnetization pattern formed on said tape formed on said recording medium by said magnetic gaps of said first recording head, side edge portions in the formation direction of said patterns are overwritten by said magnetic gaps of said second recording head, wherein

said first and second recording heads are thin-film heads, and a single head chip constituting each said recording head is provided with a plurality of magnetic gaps and wherein

said first and second recording heads are mounted on a rotary drum, and each of said magnetization patterns formed on said recording medium is an inclined track.

6. The recording and reproduction system as set forth in claim 5, wherein

said overwriting is conducted with such a positional relationship that a side edge portion of said magnetization pattern in the formation direction of said magnetization pattern formed by each said magnetic gap of said first recording head coincides substantially with the center of each magnetization pattern formed by said second recording head.

7. (Cancelled)

8. (Cancelled)

9. A magnetic recording method for performing azimuth recording on a recording medium by use of a plurality of recording heads, comprising the steps of:

forming first magnetization patterns on said recording medium by a first recording head comprising a plurality of magnetic gaps having a first azimuth angle; and

forming second magnetization patterns on said recording medium by overwriting side edge portions in the formation direction of said first magnetization patterns by a second recording head comprising a plurality of magnetic gaps having a second azimuth angle different from said first azimuth angle, wherein

said first and second recording heads are mounted on a rotary drum, and each of said magnetization patterns formed on said recording medium is an inclined track.

10. The magnetic recording method as set forth in claim 9, wherein

said overwriting is conducted with such a positional relationship that a side edge portion in the formation direction of said first magnetization pattern coincides substantially with the center in the width direction of said second magnetization pattern.

11. (Cancelled)

IX. EVIDENCE APPENDIX

NONE

X. RELATED PROCEEDINGS APPENDIX

NONE